Appendix A

U.S. Government Agency Radionavigation Roles and Responsibilities

This appendix outlines the roles and responsibilities of the Government agencies involved in planning for and providing radionavigation services.

The Department of Transportation (DOT) is responsible under Title 49 United States Code (U.S.C.) Section 301 for ensuring safe and efficient transportation. Radionavigation systems play an important role in carrying out this responsibility. The three elements within DOT that operate radionavigation systems are the United States Coast Guard (USCG), the Federal Aviation Administration (FAA), and the St. Lawrence Seaway Development Corporation (SLSDC). The Assistant Secretary for Transportation Policy (OST/P) is responsible for coordinating radionavigation planning within DOT and with other civil Federal elements.

The USCG provides U.S. aids to navigation for safe and efficient marine navigation. The FAA has the responsibility for the development and implementation of radionavigation systems to meet the needs for safe and efficient air navigation, as well as for control of all civil and military aviation, except for military aviation needs peculiar to warfare and primarily of military concern. The FAA also has the responsibility to operate aids to air navigation required by international treaties.

Other elements within DOT participate in radionavigation planning. These elements include the Maritime Administration (MARAD), the Federal Highway Administration (FHWA), the Intelligent Transportation Systems Joint Program Office (ITS-JPO), the Federal Railroad Administration (FRA), the National Highway Traffic Safety

Administration (NHTSA), the Federal Transit Administration (FTA), the Research and Special Programs Administration (RSPA), and the Bureau of Transportation Statistics (BTS). Other Federal agencies that participate in radionavigation planning include the National Aeronautics and Space Administration (NASA), and the National Geodetic Survey (NGS).

The Department of Defense (DOD) is responsible for developing, testing, evaluating, implementing, operating, and maintaining aids to navigation and user equipment required for national defense. DOD is also responsible for ensuring that military vehicles operating in consonance with civil vehicles have the necessary navigation capabilities.

The DOD is also required by statute 10 U.S.C. 2281(c) (Ref. 1) to provide for the sustainment and operation of the GPS Standard Positioning Service for peaceful civil, commercial, and scientific uses on a continuous worldwide basis free of direct user fees.

A.1 DOD Responsibilities

Specific DOD responsibilities are to:

a. Define performance requirements applicable to military mission needs.

b. Design, develop, and evaluate systems and equipment to ensure cost-effective performance.

c. Maintain liaison with other government research and development activities affecting military radionavigation systems.

d. Develop forecasts and analyses as needed to support the requirements for future military missions.

e. Develop plans, activities, and goals related to military mission needs.

f. Define and acquire the necessary resources to accomplish mission requirements.

g. Identify special military route and airspace requirements.

h. Foster standardization and interoperability of systems with North Atlantic Treaty Organization (NATO) and other allies.

i. Operate and maintain radionavigation aids as part of the NAS when such activity is economically beneficial and specifically agreed to by the appropriate DOD and DOT agencies.

j. Derive and maintain astronomical and atomic standards of time and time interval, and to disseminate these data.

k. Continue to acquire, operate, and maintain the basic GPS including a Standard Positioning Service (SPS) that will be available on a continuous, worldwide basis and a Precise Positioning Service (PPS) for use by the U.S. military and other authorized users.

l. Cooperate with the Director of Central Intelligence, the Department of State and other appropriate departments and agencies to assess the national security implications of the use of GPS, its augmentations, and alternative satellite-based positioning and navigation systems.

m. Develop measures to prevent the hostile use of GPS and its augmentations to ensure that the U.S. retains a military advantage without unduly disrupting or degrading civilian uses.

n. Ensure that the United States Armed Forces have the capability to use GPS effectively despite hostile attempts to prevent use of the system.

The National Imagery and Mapping Agency (NIMA) is responsible for mapping, charting, and geodesy (MC&G) support to DOD navigation systems which includes charts, digital terrain elevation data, digital feature analysis data, digital hydrographic chart data, point-positioning databases, geodetic surveys, and the World Geodetic System 1984 (WGS 84). This support also includes geodetic positioning of transmitters for electronic systems and tracking stations for satellite systems, maintenance of GPS fixed site operations, and generation and distribution of GPS precise ephemerides. Within DOD, NIMA acts as the primary point of contact with the civil community on matters relating to geodetic uses of navigation systems and provides calibration support for certain airborne navigation systems. Unclassified data prepared by NIMA are available to the civil sector.

The U.S. Naval Observatory (USNO) is responsible for determining the positions and motions of celestial bodies, the motions of the Earth and precise time; for providing the astronomical and timing data required by the Navy and other components of DOD and the general public for navigation, precise positioning, and command, control and communications; and for making these data available to other government agencies and to the general public. The Department of the Navy serves as the country's official time keeper, with the master clock facility at the Washington Naval Observatory.

DOD carries out its responsibilities for radionavigation coordination through the internal management structure shown in Figure A-1. Figure A-1 shows the administrative process used to consider and resolve positioning and navigation issues. The operational control of DOD positioning and navigation systems is not shown here, but is described in the Chairman, Joint Chiefs of Staff (CJCS) Master Positioning, Navigation and Timing Plan (MPNTP) and other DOD documents.

A.1.1 Operational Management

The President or the Secretary of Defense, with the approval of the President, is the National Command Authority. The Chairman, Joint Chiefs of Staff, supported by the Joint Staff, is the primary military advisor to the National Command Authority. The Service Chiefs provide guidance to their military departments in the preparation of their respective detailed navigation plans. The JCS are aware of operational navigation requirements and capabilities of the Unified Commands and the Services, and are responsible for the development, approval, and dissemination of the CJCS MPNTP.

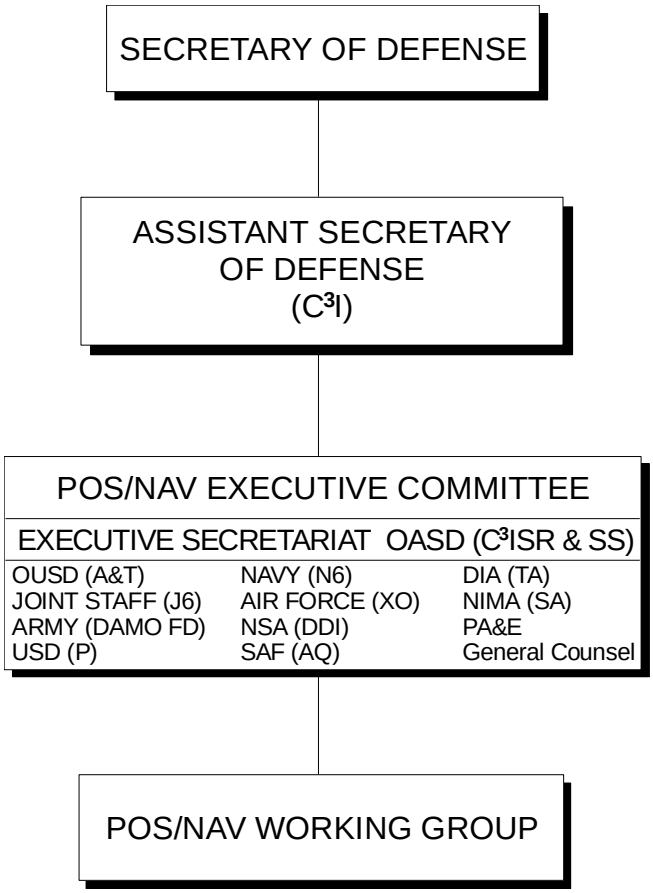

Figure A-1. DOD Navigation Management Structure

The MPNTP is the official positioning, navigation, and timing policy and planning document of the CJCS, which addresses operational defense requirements.

The following organizations also perform navigation management functions:

The Deputy Director for Defense-Wide Command, Control, Communications and Computer Systems Support, Joint Staff (J-62), is responsible for:

- Analysis, evaluation, and monitoring of navigation system planning and operations.
- General navigation matters and the CJCS MPNTP.

The Commanders of the Unified Commands perform navigation functions similar to those of the JCS. They develop navigation requirements as necessary for contingency plans and JCS exercises that require navigation resources external to that command. They are also responsible for review and compliance with the CJCS MPNTP.

A.1.2 Administrative Management

Three permanent organizations provide radionavigation planning and management support to the Assistant Secretary of Defense (C3I). These organizations are the POS/NAV Executive Committee; the POS/NAV Working Group; and the Military Departments/Service Staffs. Brief descriptions are provided below.

The DOD POS/NAV Executive Committee is the DOD focal point and forum for all DOD POS/NAV matters. It provides overall management supervision and decision processes, including intelligence requirements (in coordination with the Defense Intelligence Agency (DIA) and the National Security Agency (NSA)). The Executive Committee contributes to the development of the FRP and coordinates with the DOT POS/NAV Executive Committee.

The DOD POS/NAV Working Group supports the Executive Committee in carrying out its responsibilities. It is composed of representatives from the same DOD components as the Executive Committee. The Working Group identifies and analyzes problem areas and issues, participates with the DOT POS/NAV Working Group in the revision of the FRP, and submits recommendations to the Executive Committee.

The Military Departments/Service Staffs are responsible for participating in the development, dissemination and implementation of the CJCS MPNTP and for managing the development, deployment, operation, and support of designated navigation systems.

A special committee, the GPS Phase-In Steering Committee, has been established to guide the development and implementation of the policies, procedures, support requirements, and other actions necessary to effectively phase GPS into the military operational forces.

A.2 DOT Responsibilities

Specific DOT responsibilities are to:

a. Provide aids to navigation used by the civil community and certain systems used by the military.

b. Prepare and promulgate radionavigation plans in the civilian sector of the United States.

c. Serve as the lead agency within the U.S. Government for all Federal civil GPS matters,

d. Develop and implement U.S. Government augmentations to the basic GPS for transportation applications,

e. Take the lead in promoting commercial applications of GPS technologies and the acceptance of GPS and U.S. Government augmentations as standards in domestic and international transportation systems, and

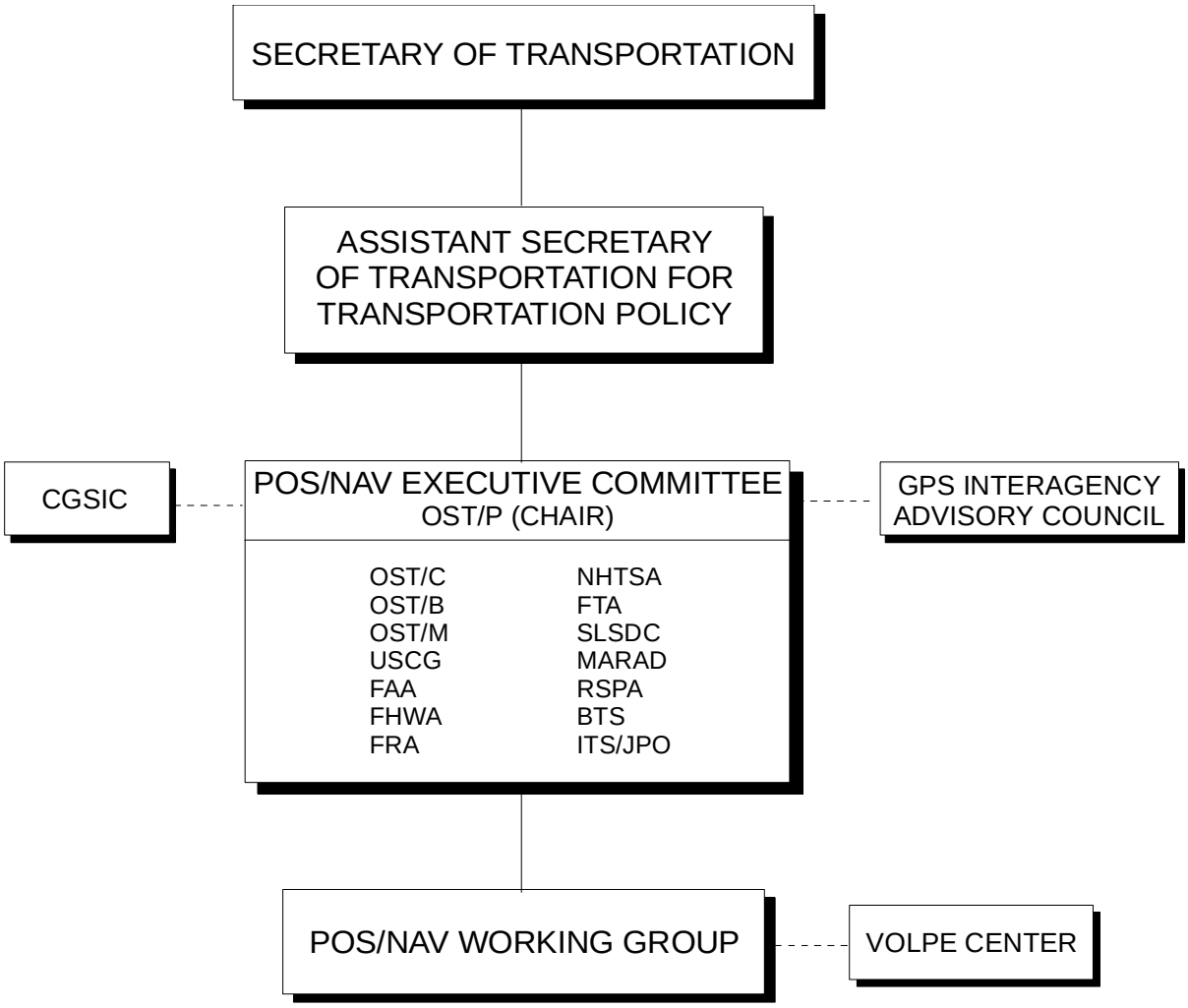

Figure A-2. DOT Navigation Management Structure

f. Coordinate U.S. Government-provided GPS civil augmentation systems to minimize cost and duplication of effort.

DOT carries out its responsibilities for civil radionavigation systems planning through the internal management structure shown in Figure A-2. The structure was originally established by DOT Order 1120.32 (April 27, 1979) and revised by DOT Order 1120.32C (October 11, 1994) to:

a. Provide a management level body which can, on a continuing basis, facilitate coordination of navigation and positioning planning on a multimodal basis within DOT, and to serve as a focal point for recommendations on which DOT navigation and positioning policies and plans can be formulated.

b. Establish a planning framework wherein the DOT operating elements are allowed maximum latitude for navigation and positioning system research, development, and implementation, consistent with OST/P policy guidance and the need to avoid duplication of effort.

c. Provide the technical resources and appropriate management structure to supplement navigation and positioning planning, implementation, coordination, and decision making of the operating elements.

d. Provide a DOT focal point for multimodal or inter-departmental navigation and positioning issues.

e. Provide liaison with DOD.

f. Coordinate DOT activities aimed at promoting international acceptance of U.S. radionavigation systems and supporting U.S. radionavigation and positioning manufacturing and service industries.

The DOT POS/NAV Executive Committee is the top-level management body of the organizational structure. It is chaired by the OST/P, and consists of policy level representatives from the General Counsel's Office (OST/C), the Office of the Assistant Secretary for Budget and Programs (OST/B), the Assistant Secretary for Administration (OST/M), USCG, FAA, FHWA, ITS-JPO, FRA, NHTSA, FTA, SLSDC, MARAD, RSPA, and BTS. Non-transportation Federal civil users of GPS are represented in the POS/NAV Executive Committee by the GPS Interagency Advisory Council (GIAC). The Civil GPS Service Interface Committee (CGSIC), chaired by OST/P, is DOT's official committee for information exchange with all GPS users.

The POS/NAV Working Group is the staff working core of the organizational structure. It is chaired by the OST/P Program Manager and consists of one representative each from OST/C, OST/B, OST/M, USCG, FAA, FHWA, ITS-JPO, FRA, NHTSA, FTA, SLSDC, MARAD, RSPA, BTS, the Volpe National Transportation Systems Center (Volpe Center), and other DOT element representatives as necessary. Each representative may be assisted by advisors. The Center for Navigation, Volpe Center, also provides technical assistance to the POS/NAV Working Group.

The Secretary of Transportation, under 49 U.S.C. Section 301, has overall leadership responsibility for navigation matters within DOT and promulgates radionavigation plans. Three DOT elements have statutory responsibilities for providing aids to navigation: the USCG, the FAA, and the SLSDC.

OST/P coordinates radionavigation issues and planning which affect multiple modes of transportation, including those that are intermodal in nature. OST/P also interfaces with agencies outside of DOT on non-transportation uses of radionavigation systems.

DOT's Civil GPS Service Interface Committee is an outreach to the user, and facilitates the exchange of issues and requirements between DOT and the GPS user, in the U.S. and internationally. The Coast Guard manages the operations of the Committee for DOT.

The USCG defines the need for, and provides, aids to navigation and facilities required for safe and efficient navigation. 14 U.S.C. Section 81 states the following:

"In order to aid navigation and to prevent disasters, collisions, and wrecks of vessels and aircraft, the Coast Guard may establish, maintain, and operate:

(1) aids to maritime navigation required to serve the needs of the armed forces or of the commerce of the United States;

(2) aids to air navigation required to serve the needs of the armed forces of the United States peculiar to warfare and primarily of military concern as determined by the Secretary of Defense or the Secretary of any department within the Department of Defense and as requested by any of those officials; and

(3) electronic aids to navigation systems (a) required to serve the needs of the armed forces of the United States peculiar to warfare and primarily of military concern as determined by the Secretary of Defense or any department within the Department of Defense; or (b) required to serve the needs of the maritime commerce of the United States; or (c) required to serve the needs of the air commerce of the United States as requested by the Administrator of the Federal Aviation Administration.

These aids to navigation other than electronic aids to navigation systems shall be established and operated only within the United States, the waters above the Continental Shelf, the territories and possessions of the United States, the Trust Territory of the Pacific Islands, and beyond the territorial jurisdiction of the United States at places where naval or military bases of the United States are or may be located. The Coast Guard may establish, maintain, and operate aids to marine navigation under paragraph (1) of this section by contract with any person, public body, or instrumentality."

The FAA has responsibility for development and implementation of radionavigation systems to meet the needs of all civil and military aviation, except for those needs of military agencies that are peculiar to air warfare and primarily of military concern. FAA also has the responsibility to operate aids to air navigation required by international treaties.

The SLSDC has responsibility for assuring safe navigation along the St. Lawrence Seaway. The SLSDC provides navigation aids in U.S. waters in the St. Lawrence River and operates a Vessel Traffic Control System with the St. Lawrence Seaway Authority of Canada.

MARAD investigates the application of advanced technologies for navigation, as well as the training of shipboard crews in all aspects of ship operations. These efforts are intended to enhance the efficiency and safety of ship operations in U.S. waters.

FHWA, ITS-JPO, NHTSA, FRA, FTA, and RSPA have the responsibility to conduct research, development, and demonstration projects, including projects on land uses of radiolocation systems. They also assist state and local governments in planning and implementing such systems and issue guidelines concerning their potential use and

applications. Due to the increased emphasis on efficiency and safety in land transportation, these organizations are increasing their activities in this area.

Other elements of the Federal government are involved with radionavigation systems in terms of evaluation, research, or operations. For example, NASA supports navigation through the development of technologies for navigating aircraft and spacecraft. NASA is responsible for development of user and ground-based equipment, and is also authorized to demonstrate the capability of military navigation satellite systems for civil aircraft, ship, and spacecraft navigation and position determination.

A.3 DOD/DOT Joint Responsibilities

A Memorandum of Agreement (MOA) between DOD and DOT provides for radionavigation planning. This agreement requires coordination between the DOD and DOT internal management structures for navigation planning. The MOA recognizes that DOD and DOT have joint responsibility to avoid unnecessary overlap or gaps between military and civil radionavigation systems and services. Furthermore, it requires that both military and civil needs be met in a manner cost-effective for the Government and civil user community.

Implicit in these joint management responsibilities is assurance of civil sector radionavigation readiness for mobilization in national emergencies. DOD and DOT will jointly:

- Inform each other of the development, evaluation, installation, and operation of radio aids to navigation with existing or potential joint applications.
- Coordinate all major radionavigation planning activities to ensure consistency while meeting diverse navigation requirements.
- Attempt, where consistent with diverse requirements, to utilize common systems, equipment, and procedures.
- Undertake joint programs in the research, development, design, testing, and operation of radionavigation systems.
- Publish the FRP to be implemented by internal departmental actions. This plan will be reviewed and updated biennially.
- Assure that other government agencies involved in radionavigation and positioning systems research, development, operation, or use are aware of and, where appropriate, are included in system planning and implementation.
- Coordinate on polices and procedures for in-band GPS testing activities.
- Chair the Interagency GPS Executive Board as directed by the Presidential Decision Directive on GPS, NSTC-6, signed March 28, 1996 (Ref. 2).
- Prepare standard definitions of requirements, and joint requirements documents for dual use systems.

- Convene joint meetings of the DOD and DOT POS/NAV Working Groups as necessary.
- Form a joint modeling and simulation effort to facilitate the coordination of radionavigation and positioning systems planning. This joint effort may include analysis of both civil and military radionavigation systems and the elimination of the potential for interference from other systems. One example is the Joint Tactical Information Distribution System (JTIDS) that currently operates in the radionavigation spectrum.* The objective is for DOD and DOT to agree upon and use a common set of analytical tools for assessing systems interactions.

A.4 Department of State Responsibilities

The PDD (Ref. 2) directs that the Department of State:

- In cooperation with appropriate departments and agencies, consult with foreign governments and other international organizations to assess the feasibility of developing bilateral or multilateral guidelines on the provision and use of GPS services;
- Coordinate the interagency review of instructions to U.S. delegations to bilateral consultations and multilateral conferences related to the planning, operation, management, and use of GPS and related augmentation systems; and
- Coordinate the interagency review of international agreements with foreign governments and international organizations concerning international use of GPS and related augmentation systems.

* The Interdepartmental Radio Advisory Committee (IRAC) Spectrum Planning Subcommittee (SPS) Working Group 1 is responsible for meeting these objectives.